Uva Wellassa University of Sri Lanka
CST 214-3 Statistical Methods-I
Group Assignment - Data Analysis and Reporting

Title: "Factors Influencing Student Performance: A Statistical Analysis"

Name: Group No -5 (UWU/CST/21/050, UWU/CST/21/006, UWU/CST/21/017, UWU/CST/21/028, UWU/CST/21/038, UWU/CST/21/066, UWU/CST/21/077, UWU/CST/21/088, UWU/CST/21/100)

Abstract: Analyzing various factors affecting student performance, our study unveils key insights. Hours Studied, Previous Scores, and Extracurricular Activities significantly impact the Performance Index, in here Gender and religion show no significant impact on performance outcomes.

Background and Questions of Interest: Understanding the factors influencing student performance is crucial for educational improvement. Key variables include Religion, Gender, Hours Studied, Previous Scores, Extracurricular Activities, Sleep Hours, and Number of Sample Question Papers Practice. Questions of interest include: How do these variables correlate with the Performance Index? Are there significant predictors?

Assumptions:

1)The values of the error term are independent of one another.
2)The variance of the error term is constant and the mean value zero.
3)The error term assumed to be normally distributed: E-N(O, 1)

Hypothesis: To test the model significance

Null Hypothesis (H0): There is no significant relationship between the independent variables and the student performance index.
Alternative Hypothesis (H1): There is a significant relationship between at least one of the independent variables and the student performance index.

Data Analysis:

Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Regression	5	43463.7	8692.7	2447.24	0.000
Hours Studied	1	6388.8	6388.8	1798.62	0.000
Previous Scores	1	33624.5	33624.5	9466.22	0.000
Sleep Hours	1	95.9	95.9	26.99	0.000
Sample Question Papers Practice	1	68.6	68.6	19.31	0.000
Extracurricular Activities	1	11.7	11.7	3.28	0.073
Error	114	404.9	3.6		
Total	119	43868.7			

Coefficients

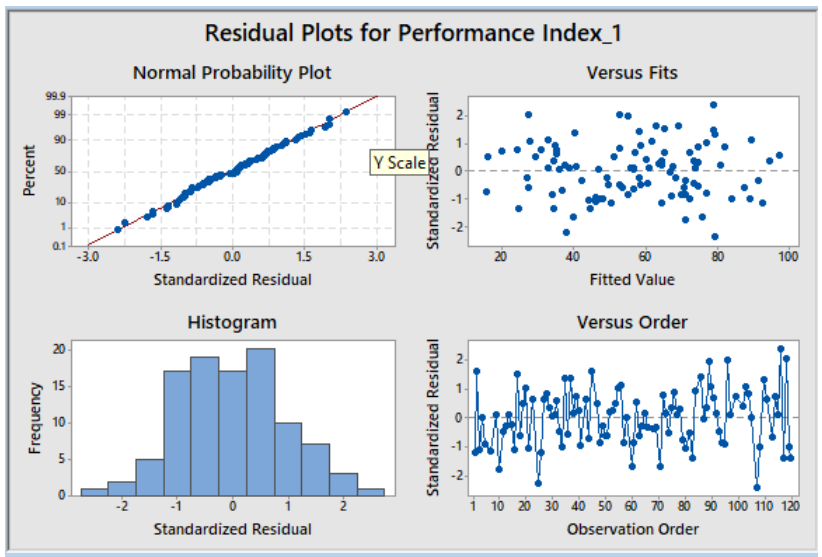
Term	Coef	SE Coef	T-Value	P-Value	VIF
Constant	-34.56	1.09	-31.59	0.000	
Hours Studied	2.8710	0.0677	42.41	0.000	1.01
Previous Scores	1.0152	0.0104	97.29	0.000	1.02
Sleep Hours	0.4916	0.0946	5.20	0.000	1.01
Sample Question Papers Practice	0.2679	0.0610	4.39	0.000	1.01
Extracurricular Activities					
Yes	0.630	0.348	1.81	0.073	1.01

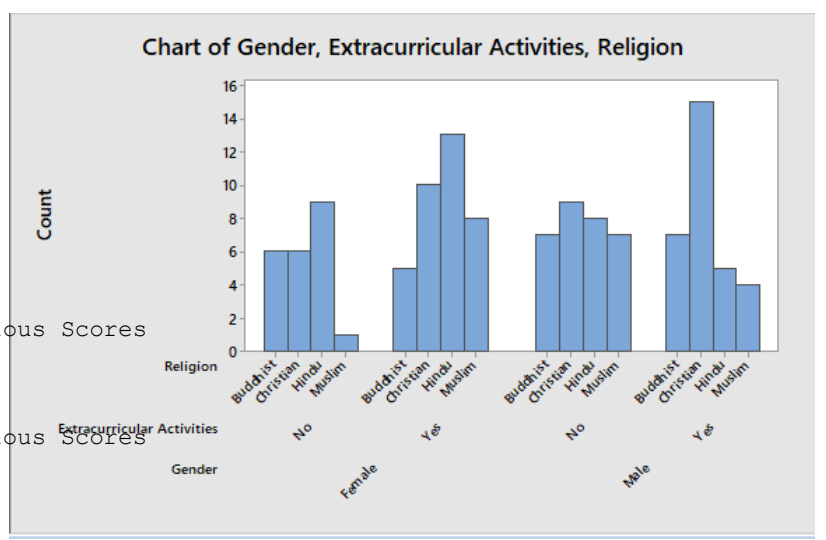
Regression Equation

Extracurricular Activities

No: Performance Index_1 = -34.56 + 2.8710 Hours Studied + 1.0152 Previous Scores + 0.4916 Sleep Hours + 0.2679 Sample Question Papers Practice

Yes: Performance Index_1 = -33.93 + 2.8710 Hours Studied + 1.0152 Previous Scores + 0.4916 Sleep Hours + 0.2679 Sample Question Papers Practice





Conclusion:

Based on this data analysis, the following factors have a statistically significant effect on the performance index of the students:
Hours studied, Previous scores, Sleep hours, and Sample question papers practice
The p-value for each of these factors is less than 0.05, which means that there is a less than 5% chance that the observed relationship between the factor and the performance index is due to random chance. Extracurricular activities have a p-value of 0.073, which is marginally non-significant. This means that we cannot be certain whether or not there is a relationship between extracurricular activities and performance index. Religion and gender were not included in the final model, so we cannot draw any conclusions about their effect on performance index from this data.

The coefficient of determination (R-squared) for the model is 0.9908, which means that the model explains 99.08% of the variance in the performance index. This suggests that the model is a good fit for the data.

Here is the regression equation for the model:

Performance Index = -34.56 + 2.8710 (Hours Studied) + 1.0152 (Previous Scores) + 0.4916 (Sleep Hours) + 0.2679 (Sample Question Papers Practice)

This equation can be used to predict the performance index of a student based on their hours studied, previous scores, sleep hours, and sample question papers practice.

Overall, the data suggests that students who study more, have higher previous scores, get more sleep, and practice more sample question papers tend to have higher performance indexes. It is important to note that this is a correlational study, so we cannot say that any of these factors cause changes in performance index. It is also possible that other factors that were not measured in this study could also affect performance index. For instance, the study did not take into account socio-economic factors that might influence a student's ability to perform well. Additionally, factors like a student's learning style or the quality of instruction they receive could also play a role.